

# (12) UK Patent Application (19) GB (11) 2 165 604 A

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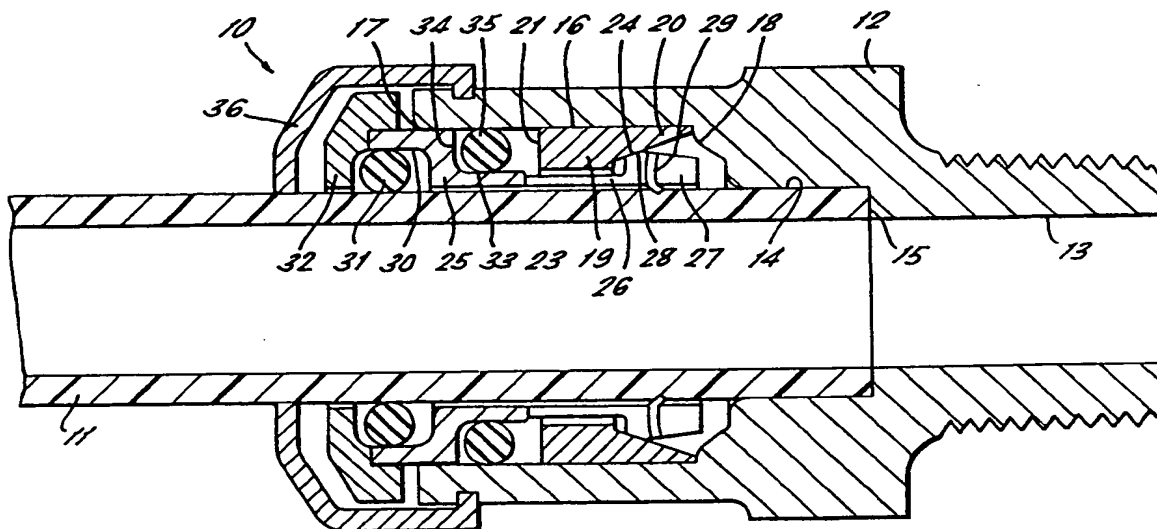
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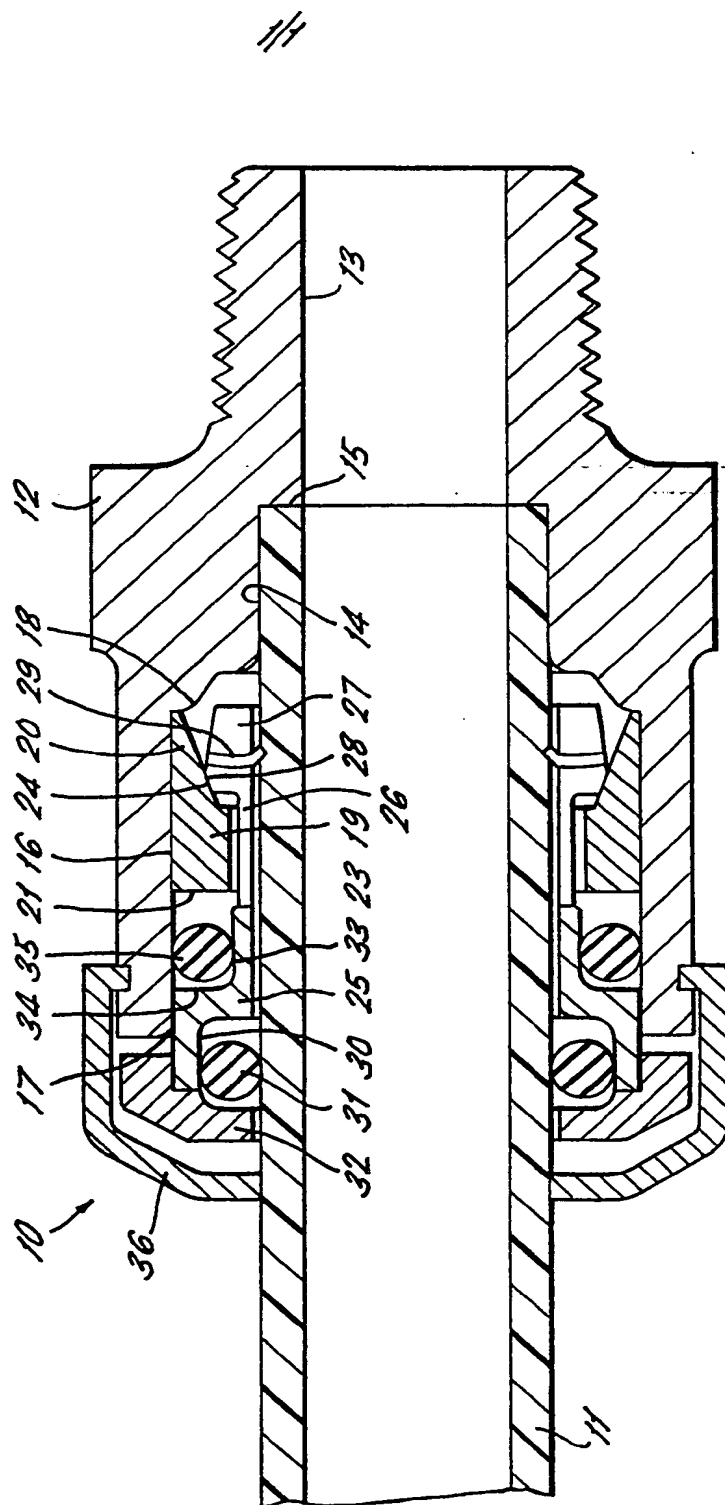
## (54) Releasable pipe couplings

(57) A tube coupling 10 in which the surface of the tube engaged by the O-ring seal does not pass through the resilient arm of the collet which can cause slight surface damage to the tube comprises a plain cylindrical plastic tube (11) with a hollow body (12) having a through way (13) extending from one end of the body into a collet (25) having a resilient arm (26). The through way has a frusto-conical cam surface (24) tapering towards the open end thereof with which the end of the resilient arm of the collet engaged moves inwardly with movement of the collet towards surface of said open end on which they clamp down against the tube progress and lock the tube in the body. The first part of the collet has an inserted external recess (33) in which an O-ring seal (35) can be moveable between the collet and sealer. At the outer end of the collet is formed with a recess (30) around its inner periphery in which an O-ring seal (31) is mounted and held in place by an end cap (32) this is the end of the collet it provides a seal between the inner side of the collet and the tube.



The drawing(s) originally filed was/were informal and the print here reproduced is taken from a later filed formal copy.

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## SPECIFICATION

## Improvements in or relating to releasable couplings

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This invention relates to releasable couplings for a tube in which a hollow body contains a tube gripping means to receive and lock a tube in the body with releasable means for allowing the tube to be released from the body and a sealing ring or rings to seal the tube with the body to prevent loss of fluid through the coupling within the tube and body. The gripping means for the tube in the body may be of the form described and illustrated in U.K. Patent Specification No.

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1520742 which discloses a tube coupling having a collet with resilient arms arranged to co-operate with a cam surface on a member surrounding the collet, which member has an internal surface tapering in one axial direction and engaging the arms of the collet so that the arms are forced inwardly by axial movement of the collet in one direction to grip the tube. A sealing ring is disposed adjacent the resilient arms in the hollow body to engage and seal with the tube held by the arms.

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Another form of gripping means comprises a resilient washer disposed in the hollow body and having resilient finger elements to bear on and grip with the tube located in the body.

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When the tube is inserted in the coupling, the gripping means may cause slight surface damage to the tube and if the sealing ring engages a part of the tube which has been passed through the gripping means, the effectiveness of the resulting seal with the tube may be diminished.

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This invention provides a releasable tube coupling comprising a hollow body having an opening at one end to receive a tube to be coupled therewith, a locking collet having a plurality of resilient fingers for engaging and locking a tube in the body, a release sleeve extending from the collet towards said opening in the body for releasing the gripping action of the resilient fingers on a tube in the collet to permit the tube to be withdrawn, a first sealing ring mounted between the release sleeve and body for sealing the outer side of the sleeve with the body and a second resilient sealing ring mounted in the release sleeve to seal between the sleeve and the tube extending through the sleeve.

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The following is a description of some specific embodiments of the invention, reference being made to the accompanying drawing which is a cross-sectional view of a tube coupling.

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The drawing shows a tube coupling indicated generally at 10 for a plain cylindrical plastics tube 11. The coupling comprises a hollow body 12 having a bore 13 which is formed with a first counter bore 14 ending in

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a shoulder 15 to receive the end of the tube

11 and a second counter bore 16 which extends from an opening 17 at one end of the body to a shoulder 18 in the body stepping the second counter bore 16 inwardly to the first counter bore 14.

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An insert sleeve 19 is mounted in the counter bore 16 and one end of the sleeve 20 bears against the shoulder 18 and the other end of the sleeve 21 faces towards the open end 17 of the body.

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The tube 11 passes through the sleeve 19 with clearance and the inner surface of the part of the sleeve adjacent the end 20 thereof is formed with a frusto-conical cam surface 24 which has its larger diameter at the end of the sleeve and its reduced diameter partway along the sleeve. A collet 25 is also mounted in the counter bore 16 and has a plurality of resilient fingers 26 extending through the sleeve 19

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and terminating in heads 27 having inclined faces 28 on the outer side thereof to engage the cam surface 24. Metal teeth 29 project from the inner side of the heads 27 to engage and grip with the outer surface of the tube 11 within the collet. Clamping action between the heads and tube is enhanced by any force attempting to pull the tube 11 out of the coupling which would draw the head 27 with the tube in a direction towards the open end of the coupling and thereby increase the clamping action of the heads with the tube by reason of the inclined cam surface 24 acting on the heads.

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The end of the collet 25 projecting from the body 12 is formed with an inner annular recess 30 in which a resilient O-ring seal 31 is mounted to engage the tube 11 extending through the collet and is held in place by a cap 32. The outer side of the collet 25 is formed with a recess 33 providing a shoulder 34 facing inwardly of the bore 16 and a second resilient O-ring seal 35 is mounted between the shoulder 34 and the end 21 of the aforesaid sleeve 19 to provide a seal between the outer side of the collet and the counter bore.

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The sealing 31 acting on the outer side of the tube 11 does not of course act on a part of the tube which has been engaged by the collet gripping heads 27 and so any abrasion or damage to the tube as a result of the gripping action of the metal inserts in the heads on the tube does not impair the effectiveness of the seal 31 with the tube. Both seals 31 and 35 are also conveniently positioned to be extracted from the coupling should they need to be replaced for any reason.

Finally the end part of the coupling has a snap-on end cover 36 to protect the end of the coupling.

It will of course be appreciated that many modifications may be made to the above described embodiment without departing from the scope of the invention. For example the

resilient finger elements formed integrally with the collet 25 may be replaced by a spring washer mounted in the body 12 and having internal resilient fingers to engage and grip the tube in the body, the fingers being released from the tube by pressing the collet or sleeve 25 into engagement with the fingers to flex them away from the tube.

## 10 CLAIMS

1. A releasable tube coupling comprising a hollow body having an opening at one end to receive a tube to be coupled therewith, a locking collet having a plurality of resilient fingers for engaging and locking a tube in the body, a release sleeve extending from the collet towards said opening in the body for releasing the gripping action of the resilient fingers on a tube in the collet to permit the tube to be withdrawn, a first sealing ring mounted between the release sleeve and body for sealing the outer side of the sleeve with the body and a second resilient sealing ring mounted in the release sleeve to seal between the sleeve and the tube extending through the sleeve.

2. A releasable coupling as claimed in claim 1 wherein the release sleeve has an annular recess around the inner side of the sleeve adjacent the end thereof at the opening into the hollow body in which said second resilient sealing ring is mounted to engage at tube extending through the sleeve.

3. A releasable coupling as claimed in claim 2 wherein the recess adjacent the end of the sleeve is formed by a counter bore at the open end of the sleeve and the resilient ring is retained in the counter bore by a cap attached to the end of the sleeve.

4. A releasable coupling as claimed in any of the preceding claims wherein the outer side of the release sleeve has a shoulder facing along the sleeve away from said end of the sleeve adjacent the opening into the hollow body and the throughway in the hollow body is formed with an abutment extending around the throughway and facing towards the open end of the throughway, the first resilient sealing ring being disposed between the shoulder around the sleeve and the abutment around the throughway.

5. A releasable coupling as claimed in claim 4 wherein said abutment in the throughway is formed on one end of an insert sleeve in the throughway, the other end of which is formed with a tapered cam surface diverging away from the open end of the throughway and which is engaged by the resilient elements of a collet to squeeze the elements into engagement with the tube within the collet when the collet is drawn in the direction towards the open end of the throughway.

6. A releasable coupling as claimed in claim 5 wherein the resilient elements are formed integrally with the release sleeve whereby pressing the sleeve into the through-

way releases the force acting on the resilient elements by engagement with the tapered cam surface to release the elements from the tube and allow the tube to be withdrawn from the collet.

7. A releasable coupling as claimed in claim 1 wherein the resilient finger elements are formed on the inner periphery of a spring washer mounted in the throughway to engage with and grip a tube located in the throughway and the release sleeve is aligned with the resilient fingers so that by pressing the sleeve into the throughway against the fingers, the fingers can be deflected out of engagement with the tube therein.

8. A releasable coupling substantially as described with reference to and as illustrated in the accompanying drawings.

## 85 CLAIMS (13 December 1985)

New claims or amendments to claims filed on 13.12.85.

Superseded claims 1-8. 1. A releasable tube coupling comprising a hollow body having an opening at one end to receive a tube to be coupled therewith, a locking collet having a plurality of resilient fingers for engaging and locking a tube in the body, a release sleeve extending from the collet towards said opening in the body for releasing the gripping action of the resilient fingers on a tube in the collet to permit the tube to be withdrawn, the release sleeve having an annular step to be withdrawn, the release sleeve having an annular step part-way along the sleeve from the resilient fingers to provide an increase in diameter and from one shoulder facing along the outer side of the sleeve towards the resilient fingers and a second shoulder facing in the opposite direction along the inner side of the sleeve towards the free end of the sleeve, a first sealing ring encircling the release sleeve adjacent said one shoulder to seal with the body in which the sleeve is disposed and a second sealing ring disposed in the release sleeve adjacent the second shoulder to seal with a tube extending through the sleeve.

2. A releasable coupling as claimed in claim 1 wherein the throughway in the hollow body is formed with an abutment extending around the throughway and facing towards the open end of the throughway and the first resilient sealing ring is disposed between said one shoulder on the sleeve and the abutment in the throughway.

3. A releasable coupling as claimed in claim 2 wherein said abutment in the throughway is formed on one end of an insert sleeve in the throughway is formed on one end of which is formed with a tapered cam surface diverging away from the open end of the throughway and which is engaged by the resilient elements of a collet to squeeze the elements into engagement with the tube within the collet when the collet is drawn in the di-

resection towards the open end of the through-way.

4. A releasable coupling as claimed in claim 3 wherein the resilient elements are formed integrally with the release sleeve whereby pressing the sleeve into the through-way releases the force acting on the resilient elements by engagement with the tapered cam surface to release the elements from the tube and allow the tube to be withdrawn from the collet.

5. A releasable coupling as claimed in claim 1 wherein the resilient finger elements are formed on the inner periphery of a spring washer mounted in the throughway to engage with and grip a tube located in the throughway and the release sleeve is aligned with the resilient fingers so that by pressing the sleeve into the throughway against the fingers, the fingers can be deflected out of engagement with the tube therein.

6. A releasable coupling substantially as described with reference to and as illustrated in the accompanying drawings.

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